Page 1 *Overview*

Once a concussion is identified, your focus is to manage the injury to prevent potentially catastrophic outcomes. Managing the concussion involves more than just treating the injury. The goal of concussion management is ***to maximize recovery and prevent long-term and chronic manifestations of issues, to pull everything together for the recovery team comprised of the patient, parents, school and athletic personnel, and you, the licensed health care professional.***

Primary v. Secondary Prevention

Primary Prevention

In concussion management, the purpose of primary prevention is to minimize further exposure to risk by educating coaches, athletes, and parents. As part of that education process, emphasize to all that there is no such thing as a "concussion-proof helmet". But also emphasize that it is essential to:

- Use proper, well-fitted safety equipment, such as helmets, headgear, and mouthpieces.
- Teach proper playing techniques to reduce risks during play.
- Advocate sport-wide rule changes as needed to mitigate undue risks during play.
- Enforce existing rules.

Secondary Prevention

Secondary Prevention seeks to prevent the establishment or progression of a chronic condition after injury exposure. The procedures you learn in this module to detect and treat pre-clinical pathological changes will help minimize long-term difficulties and accomplish secondary prevention.

Concussion Management is Critical

As discussed earlier in this course, appropriate medical management avoids exposing the athlete to serious risks. When managing concussions, the potential impacts of such risks may fall into one or more of these categories:

IMPACT	***Examples***	
Medical	• Second Impact Syndrome. • Subconcussive blows / repeat impacts / cumulative concussions. • Post-concussion symptoms, such as chronic headaches.	
Athletic	• Poorer brain and / or motor function. • Missed practices. • Difficulty processing information. • Diminished performance with subsequent increased risk of injuring self or others.	
Vocational / Educational	Prolonged absence that lowers achievement levels and requires costly, timeconsuming, difficult make-up work.	
Social	*(how others see the patient)* Relationship problems. Damage to the patient's support systems.	
Emotional / Behavioral	**In younger youth:** • Acting out behaviors. • Sleep disruption.	**In older youth**: • Depression. • Anxiety. • Irritability. • Mood issues.

		• Sleep disruption.

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Page 2 ***Managing Risk***

Treating concussion involves managing risks. It's a multi-stage process in which each stage is interrelated with the others, and each stage is necessary to move on to the next. This cycle begins and ends with education.

You **educate** yourself so you can **recognize**.
You **recognize** so you can **diagnose**.
You **diagnose** so you can **manage**.
As part of **managing**, you **educate** athletes, family, coaches, and school staff.

Managing Risk Stages

Licensed Health Care Professional Education

Educate yourself to remain current on best practices as well as research advances that will deepen your understanding of mTBI.

Use resources such as:

- This course.
- Centers for Disease Control (CDC). http://www.cdc.gov/headsup/index.html
- The 4th International Conference on Concussion in Sport *Zurich Statement*. http://bjsm.bmj.com/content/47/5/250.full
- American Medical Society for Sports Medicine (AMSSM): *Concussion in Sport*. http://bjsm.bmj.com/content/47/1/15.long
- Institute of Medicine (IOM) *Sports-Related Concussions in Youth: Improving the Science, Changing the Culture.* http://www.nap.edu/read/18377/chapter/1

Recognition by the licensed health care professional and anyone who works with students in activities that may pose a risk of concussion.

Whether you are the primary licensed health care professional or part of a team, commit to removing and referring injured athletes. "When in doubt, sit it out," as the CDC advises. Provide a reality check for all regarding long-term consequences. Make the case that:

- Playing with a concussion increases physical risk and risk for long-term consequences.
- Playing injured reduces odds of success for the team because the player is not up to his or her usual form.
- Participating while not up to par may actually hurt scholarship chances because the athlete is not playing to his or her potential.

Diagnosis by the licensed health care professional.

Assess and apply the information and techniques discussed in Module 4 of this course. Make a clinical decision based on:

- Physical examination.
- Clinical history.
- Symptoms and signs.
- Neurologic examination (including vision and balance).
- Cognitive assessment.

Management by the licensed health care professional and anyone who works with the injured child.

Lead a team effort to understand and track the recovery process:

- Carry out comprehensive, multifaceted oversight, with members of the team monitoring symptoms across areas that can be impacted, utilizing the available resources.
- Note that this is an intensive, complex process. A licensed health care professional cannot simply hand the injured athlete a checklist and say, "See you in 10 days."
- Be aware, and make the team aware that if the patient is compliant, progression tends to be positive. A patient does not get worse unless there is additional injury, or unless the patient is pushing too far too soon.

Ongoing Team Education for the management professionals, parents, and injured.

Educate the patient and those around him or her regarding risk avoidance, symptom reoccurrence, and any issues that may affect the patient's recovery. Use resources such as:

- National Federation of State High School Associations **(**NFHS). https://www.nfhs.org/resources/sports-medicine/
- American Medical Society for Sport Medicine (AMSSM) position paper. http://bjsm.bmj.com/content/47/1/15.long

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Page 3 ***Acute Management***

The stages of *concussion* recovery depend on where the patient is in the continuum of *symptom* recovery. Your job as the licensed health care professional is to understand symptoms, and be aware of whether they do or do not exist.

The initial approach is to get symptoms to resolve as quickly as possible. For your patient, it can be comparable to treating the flu — taking care of it involves simple steps: hydrate, adjust activity levels, pay attention to symptoms, get help, and get as much rest as he or she chooses.

Rest versus Activity

After a brief period of rest during the acute phase (24–48 hours) after injury, patients can be encouraged to become gradually and progressively more active while staying below their cognitive and physical symptom-exacerbation thresholds (i.e., activity level should not bring on or worsen their symptoms). It is reasonable for athletes to avoid vigorous exertion while they are recovering. The exact amount and duration of rest is not yet well defined in the literature and requires further study (McCrory 17, p 5)

Replace Par 2 with:
However, be aware that *strict* rest for five days following an injury offers no additional benefit over the

usual one to two-day rest (Thomas, 2015). It has been shown that children who did two days of nothing actually fared better than children who did five days of nothing.

See: Thomas, DG *et al.* **Benefits of Strict Rest After Acute Concussion: A Randomized Controlled Trial**. *Pediatrics. 2015. 135(2): 1-11.*
http://pediatrics.aappublications.org/content/pediatrics/135/2/213.full.pdf

Listen to Your Body
Video

KODY MOFFATT, MD, MS, Children's Hospital & Medical Center, Director of Pediatric Sports Medicine
And it's important that young people really pay attention to how they're feeling and what their body is trying to tell them.

RUSTY McKUNE, ATC, Nebraska Medicine, Sports Medicine Program Coordinator
If they become symptomatic, then that's the only way we really know that they're doing too much.

KODY MOFFATT
One of the biggest things that we've learned over the last few years has been most people will recover and will recover well as long as the head doesn't get hit again while they're recovering.

LORI TERRYBERRY-SPOHR, PhD, ABPP, Madonna Rehabilitation Hospital, Director of Rehabilitation Programs
So there are some important things that we like to tell all of our patients. Those include things like no climbing on anything.

KODY MOFFATT
I like to keep people off of anything with wheels. Make sure they keep their feet on the ground.

LORI TERRYBERRY-SPOHR
Also staying away from contact sports. That's just too high risk during this time, and because of changes in reaction time, processing speed, and balance increases their risk for re-injury, which is something we're really trying to avoid.

RUSTY McKUNE
The typical guidelines that I like to use are no more than 2 hours of screen time throughout the day. And when you're dealing with students, that can be very difficult.

LORI TERRYBERRY-SPOHR
Often kids want to know when can I use my phone and when can I use my computer? If it increases their symptoms and makes their head aches worse, that's something we really do want to avoid. But if they can tolerate it for short periods of time, like fifteen or twenty minutes, it's not likely to be harmful to the patient from anything we know at this point.

KODY MOFFATT
Early on especially around two days of physical and mental rest really seems to be key.

RUSTY McKUNE
We want to make sure that we allow that brain to have that cognitive rest. We want to allow that body to have physical rest. But we also want to make sure that we don't isolate the patient from their peer groups and their friends, from their other activities. Because if we do that for too long, then what we find is that we run into other issues such as depression, isolation, and these can enhance or create a prolonged recovery.

LORI TERRYBERRY-SPOHR
Strict rest following a concussion is something that we kind of went through a time period where people thought it was perhaps important.

RUSTY McKUNE
We now know that early activity does tend to enhance the recovery process, but again we have to find that fine balance between doing too much too soon and not doing enough.

LORI TERRYBERRY-SPOHR
It's really not necessary for any of our current research to lock the patient in a room or have them completely in a darkened environment away from all stimuli. It actually may reinforce them being in a sick role, and that's not something we want to encourage.

KODY MOFFATT
As people can tolerate more activity, it's important to re-engage physical activity. We've learned that if you keep physical activity shut down for too long, especially in somebody who's normally athletic, then we actually slow down recovery as well. We want to allow enough contact and enough stimulation to support recovery but not so much that we're pulling it back.

LORI TERRYBERRY-SPOHR
But rest is still important. Getting a good night's sleep, taking naps if necessary, good nutrition, all of those things likely contribute to a positive recovery.

RUSTY McKUNE
There's also some areas that we aren't quite sure exactly how much is too much, and that's where the symptoms come in.

LORI TERRYBERRY-SPOHR
Having them keep a symptom log of what kind of things are happening before and after their headaches, or before and after their dizziness spells, or perhaps their vision difficulties can be really helpful in understanding what kinds of modifications you can make to facilitate their recovery.

KODY MOFFATT
In general when it comes to symptoms in concussion recovery, if it hurts, don't do it.

Here is an example of a symptom log your patient can use as a daily diary / log of symptom triggers:

Date	Time of day	Symptom	What were you doing when it occurred?	How bad was it on a scale from 1 to 10?
May 5	Early afternoon	• Headache • Fatigue • Dizziness	Reading on a computer	About a "6"

Precautions for the Licensed Health Care Professional

At an early stage, discuss with the patient and parents your views on over-the-counter medications. Warn your patient about self-medicating. Tell the patient not to take over-the-counter drugs, use alcohol, or take other drugs without input and approval from you, because inappropriate use of these items could worsen the symptoms.

Because it's difficult for children to reduce activities (they want to do *something*), suggest specific, simple, symptom-based alternatives to replace behaviors that may prove too much at this stage of recovery. This will help ensure the patient doesn't engage in behaviors that will worsen symptoms, such as spending too much time looking at screens or trying to read text.

Alternative activities should limit physical exertion and visual strain; exclude heavy-duty problem solving or anything requiring prolonged cognitive exertion; and also be activities that help the patient avoid emotional over-stimulation.

Early Precaution List for Concussion Patients
Listen to your body. If an activity bothers you or causes symptoms, don't do it!
You don't have to sit on a couch. You *do* have to be mindful of what you're doing. ○ Go for a walk. ○ Play a simple board game. ○ Take a "spa" bath with pleasant smells, soft music, and other relaxing features. ○ Give yourself a manicure. ○ Listen to recorded books or quiet music. ○ Do the dishes. ○ Arrange flowers. ○ Interact with a pet.
No contact sports. In fact, most sports are out, especially strengthening or training sports, like weightlifting. Weightlifting involves abrupt movements and quickly increases intracranial pressure, which may make your symptoms worse.
No driving. Symptoms of concussions impair your reaction time. It's not unusual for a young person recovering from a concussion to drive too soon and get into a car wreck.
Don't get on any wheels. Skateboards, bikes, and other rolling things are out.
Don't climb. Keep your feet on the ground. Roofs, trees, trampolines, playground equipment, etc. are not for you, at least for now.
Reduce visual activities, such as reading and computer use. ○ Avoid prolonged reading of textbooks. (The length of your assignments should be reduced.) ○ As for using a computer or other device with a screen, it's up to you to monitor yourself and stop before you trigger symptom issues.
Take sick leave or take time off. If you're not going to school and/or not taking part in sports, then you shouldn't be working at a part-time job, either.
Be patient with these restrictions. They won't last forever. They all depend on reducing and eliminating symptoms. You can log your progress in a diary.
Take control of your recovery! Stick to the management plan, and you will get better. "Cheating" on the plan (doing too much too soon) will delay recovery. It's up to you.

* *

Page 4 ***Ongoing Management***

Naturally, you will want to see a trend of improving symptoms. Clusters of symptoms can resolve spontaneously.

- The majority (80–90%) of concussions clinically resolve in a short period (1-4 weeks), although the recovery time frame may be longer in children and adolescents." (Berlin 2016 in McCrory 2017)
- High school athletes (ages 14-18) tend to recover more slowly than collegiate athletes. (IOM, 2014) http://www.nap.edu/read/18377/chapter/1
- The first two bullets demonstrate that there is inconsistency in how mTBI injuries progress. This reinforces the importance of monitoring your patient carefully.
- Most young people tend to recover well as long as they stick to low-risk activities.
- Too much activity or exertion too soon can affect the recovery pattern by increasing intracranial pressure, worsening the symptoms of the concussion. Symptom reoccurrence with over-exertion is commonplace.
- The injured youth may be asymptomatic at rest, but that doesn't mean the patient is truly without symptoms.
- When the patient is symptom-free, the patient should be able to ease back into high-level activities without exacerbating his or her condition.
- If recovery is not trending positive, rule out behavioral problems (e.g., not complying with treatment plan in some way) as a cause. The patient's symptom diary can be of great help in identifying such issues.
- Resolved symptoms do not necessarily mean that an individual is fully recovered. Delayed recovery will be discussed in detail in Module 6.
- "Recent literature suggests that the physiological time of recovery may outlast the time for clinical recovery. The consequence of this is as yet unknown, but one possibility is that athletes may be exposed to additional risk by returning to play while there is ongoing brain dysfunction" (p.5, McCrory et al, 2017)

Assess As Needed

Video

RUSTY McKUNE, ATC, Nebraska Medicine, Sports Medicine Program Coordinator
The management processes is intense, and part of that is because it has to be individualized.

KODY MOFFATT, MD, MS, Children's Hospital & Medical Center, Director of Pediatric Sports Medicine
I think it's important as symptoms progress and move forward and hopefully improve quickly, to keep an eye on specific symptoms and what makes those symptoms worse. So much of concussion recovery is subjective and based on how someone feels rather than hardcore objective data.

LORI TERRYBERRY-SPOHR, PhD, ABPP, Madonna Rehabilitation Hospital, Director of Rehabilitation Programs
It's really up to each individual health care provider how often you reassess your patient during the recovery process.

KODY MOFFATT
Ninety percent of these kids will get better within two or three weeks. Ten percent wind up taking a little bit longer.

LORI TERRYBERRY-SPOHR
Some research here done in the state of Nebraska indicated high school athletes with their first concussion often recover in about seven days. But there was considerable individual variability, ranging sometimes from three days to fifteen days or longer, particularly if it wasn't their first concussion.

KODY MOFFATT
If somebody is having more symptoms or more complex symptoms, I tend to see them more frequently. If things are stable and improving, then I'll often spread those visits out.

LORI TERRYBERRY-SPOHR
Some people prefer to see them fairly frequently, particularly, for example, like a certified athletic trainer in the school setting may see them daily to assess their recovery patterns versus a physician who's outside the school system or working in another environment may see them every week or two, depending on the recovery process.

RUSTY McKUNE
The management process is a team approach.

KODY MOFFATT
So when you're reassessing a patient and follow-up, it's important to get feedback from the school, the parent, and the athlete himself.

RUSTY McKUNE
The licensed health care professional is going to be the individual that sees the patient initially and sets the course and sets the direction for the management of the injury. But it really is going to be those other team members that may be responsible for the daily interactions with the patient, helping them determine what behaviors cause symptoms, what behaviors help reduce the symptoms, and then providing that feedback to the patient and also to the licensed health care professional.

LORI TERRYBERRY-SPOHR
It's very important for you as the provider to maintain contact with those who are following that recovery process, to assure that the individual has sufficient time to recover before their return to high-risk activities.

RUSTY McKUNE
But it's going to be specifically up to the licensed health care professional to know their patient, to understand how age plays a factor in the recovery processes, and understand the activities that individual is going to be engaged in that may impact their recovery.

Parents, school staff, or others on the team need to assess the patient every day. Educate the patient about what his or her symptoms mean. Ensure the patient understands what the symptom is relative to his or her own experience. Make sure the symptoms are truly injury-related (not pre-morbid concerns.)

Any assessment you use should include all five domains: symptom clusters, physical signs, behavior changes, cognitive impairment, and sleep disturbance.

Compare the ongoing assessments with the initial clinical assessments, and document the patient's progress. Symptoms may show up an hour or more after an activity (or may be immediate). Reviewing the pattern of activity and timing of symptom increases can help guide future behavior and activity.

If symptoms get worse, you need to communicate with the team, which as a group can recommend modified activities. Useful assessment tools are found on the Resources page of this course.

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Page 5 ***Return to Activity***

Assessing & Approving Return

Video

RUSTY McKUNE, ATC, Nebraska Medicine, Sports Medicine Program Coordinator
Now we know that Return to Activity -- it's about involving the patient and their family into a gradual return to a number of different things.

LORI TERRYBERRY-SPOHR, PhD, ABPP, Madonna Rehabilitation Hospital, Director of Rehabilitation
I like to see the induvial early in the process to provide education and information about how this process will proceed. And then ask them to call me periodically to provide me updates on how they're doing.

RUSTY McKUNE
When is it appropriate for these individuals, these patients, to be returning to school? When is it gonna be appropriate for them to Return to Play?

LORI TERRYBERRY-SPOHR
You may choose to return a patient to their academic setting while they still have some low level symptoms, but that doesn't mean that they're ready yet to go back to Return to Play.

KODY MOFFATT, MD, MS, Children's Hospital & Medical Center, Director of Pediatric Sports Medicine
It's important to talk re-engaging school and school attendance even while some symptoms are still present.

LORI TERRYBERRY-SPOHR
There's some general guidelines, like being able to pay attention and focus for thirty minutes is a good starting place. But if the school can be accommodating and allow them to take breaks or lay down in the nurse's station, they may be able to go back sooner.

KODY MOFFATT
Many students aren't able tolerate a full day of school early on and will often need breaks during the day. They may need a shortened school day or the opportunity to be in quieter environ, control passing periods, staying out of the cafeteria. Once we can get through a full school day and back to normal baseline, then we can begin progressing on the athletic field.

LORI TERRYBERRY-SPOHR Because we typically assume that they are completely symptom-free before any Return to Play aspects are incorporated into that progressive return to full activities. **KODY MOFFATT** And we begin with increasing aerobic activity, increasing resistance, doing some non-contact sportsspecific activity before engaging in contact. **LORI TERRYBERRY-SPOHR** I also like to see them again before returning them to any sort of contact activity, to make sure that we thoroughly assess those cognitive symptoms as well as any aspects of dizziness or other symptoms that may not be resolved. **RUSTY McKUNE** And a lot of that will come down to the preference and the experience that the licensed health care professional has in dealing with the concussions.

As a licensed health care professional, you do your best to provide guidance to the patient, family, schools, and athletic leadership to ensure the best outcome as the young person returns to activity. Not everyone will want or choose to follow this guidance, but it's your responsibility to advocate for best practices tailored to the individual case.

The licensed health care professional stays involved throughout the patient's recovery and, based on assessment, provides written approval for the patient to begin re-entry into normal life, including school and athletics.

Historically, concussion management focused on **Return to Play**, which in most cases is initiated when the patient no longer has symptoms, scores normal in neurocognitive testing, shows normal balance, and has completed a gradual **Return to Play Progression**.

But there has been a cultural shift. The goal in recovery has expanded from achieving **Return to Play** to completing a structured and safe **Return to Activity.**

Return to Activity = Return to Learn + Return to Play

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Page 6 ***Return to Learn***

Return to Activity begins with a Return to Learn Progression. Although Return to Learn is the last of the four components of the Nebraska Concussion Awareness Act, it is actually the most important part of the law. It appears last only because it was added as an amendment to the original legislation. (See Module 1.)

For your patient, Return to Learn is of higher priority than Return to Play. The Return to Learn Progression should always precede the Return to Play progression, because the activity required for the return to learning involves less risk than returning to physical activity, especially rigorous athletics.

Teamwork

To carry out the **Return to Learn Progression**, you and your patient will need support, because although concussion is a medical diagnosis, concussion *management* is a team process. Communication is essential to this process.

Mutual respect will enhance your communication with school staff, parents, coaches, athletic trainers, and other team members striving to help your patient recover. You need to delineate the medical picture for the team. Working closely with the schools, your team will determine the best course of action together.

For more detail about building and working effectively as a management team, consult resources such as Nebraska Department of Education's **Bridging the Gap**. It provides responses to intervention that are student-centric, with family, medical, school, and coaches / athletic personnel supporting the process.

NDE's Bridging the Gap
http://www.education.ne.gov/sped/birsst/BRIDGING%20THE%20GAP%20Booklet%20plus%20Appendices.pdf

Of Special Note: Working With Schools
Bear in mind: • Your role is to say where the student is in terms of recovery. Since school staff members (such as athletic trainers) see the student on a daily basis, they can provide you with valuable data and/or offer observations. • You can provide schools with *recommendations* regarding what you see as best for the student, which the schools can use in planning the actual adjustments. It's a good idea to present your ideas as feedback from a medical perspective, not as orders. • You need to provide specific recommendations and to follow up on symptoms and symptom trends rather than just to issue an order such as "No football for five days" with no further assessment. • Accept that while schools will welcome your ideas, some may perceive such recommendations as 'telling teachers how to teach.' Maintaining a team mindset will help you keep the lines of communication open and equip you to encourage compliance with your guidance.

Return to Learn Progression

Return to Learn has its own stages. Prior to beginning a Return to Learn Progression, if there is no increase in symptoms, the individual can engage in daily living activities, undertake relaxation exercises, listen to soft music, listen to an audio book, and so on, adding intervals of 20 minutes at a time.

The Return to Learn Progression itself should be individualized and gradual. Students may start at any of these steps, depending on the symptoms. It's up to the team to continually monitor and assess in order to recommend where the student should be at any point.

Return to Learn Progression Example

Steps	Progression	Description
1	**HOME: Acute** *Cognitive & physical rest*	Limited mental exertion.
2	**HOME** *Light mental activity*	Up to 30 minutes mental exertion.

3	**SCHOOL: Part Time** *Maximum adjustments*	▯ Shortened day and / or schedule. Quiet ▯ environment. ▯ Provide extra time and help.
4	**SCHOOL: Part Time** Maximum adjustments	▯ Modified classroom testing. ▯ Moderate decrease of extra time and help.
5	**SCHOOL: Part Time** Minimal adjustments	▯ No standardized testing. Routine ▯ tests OK.
6	**SCHOOL: Full Time** No adjustments	▯ Attends all classes. ▯ Full homework and testing.

BIRSST Return to Academics Progression
http://www.education.ne.gov/sped/birsst/Return_to_Academics_Progression.pdf

Once the student is back at school part-time, there are various types of adjustments available to help the patient handle various symptoms.

Short Term Adjustments
A **Return to Learn Progression** involves short term, temporary adjustments for the student in the classroom. Patients may recover very quickly, but also may be symptomatic for a few months. Short term adjustments may be needed.

It will be up to the school to decide which adjustments are necessary and useful for a particular student. For example, you may recommend dark glasses to help the student cope with light sensitivity. But school staff may know that this particular youth is inclined to doze off when wearing dark glasses, so dimming lights would be a better adjustment for him.

Adjustments may include:
- **Informal adjustments**, such as eliminating nonessential parts of assignments so the student can focus on essential material, building rest periods into class, and limiting participation in practices for non-sport activity.
- **Formal adjustments**, such as being allowed to attend for half days when first back in school to avoid overwork, later start times for the school day, and shorter class periods.
- **Modifications of curriculum**, especially during the first week, such as limiting requirements that involve computer use, extending deadlines, or limiting homework, papers, and tests.
- **Environmental modifications,** such as dimming lights or allowing the student to wear earplugs to reduce noise or sunglasses to reduce glare, or eating lunch somewhere darker and quieter than a bright, noisy cafeteria.
- **Monitoring** by medical or academic staff. As discussed earlier, you can help the student self-monitor and know when to limit or quit an activity.

BIRSST Tips for Teachers (to help with adjustments for an injured student)
http://www.education.ne.gov/sped/birsst/Tips_for_Teachers.pdf

Long Term Accommodations
In a very small percentage of cases, the patient's symptoms may be chronic. The concussion management team, in this case led by the school, may determine that the patient may benefit from a Section 504 Education Plan for services, accommodations, or educational aids. In rare cases, more

permanent conditions may require an Individualized Educational Plan (IEP). Long term accommodations will be discussed in greater detail in Module 6.

Section 504 Education Plan
http://www2.ed.gov/about/offices/list/ocr/504faq.html

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Page 7 ***Return to Play***

Back in the Game
Video

KODY MOFFATT, MD, MS, Children's Hospital & Medical Center, Director of Pediatric Sports Medicine
Return to Play is much riskier than the return to learn process. The real bad nasty things that happen with a concussion really seem to happen with that second blow to the brain before the initial blow has had a chance to completely heal.

RUSTY McKUNE, ATC, Nebraska Medicine, Sports Medicine Program Coordinator
So the reality of it is if we're talking Return to Learn and we overdo it, realistically the worst thing that may happen is we maybe see an increase in symptoms. When we are talking about Return to Play, if we do too much too soon and put them at a great risk too early, we could be talking about catastrophic outcomes because we're talking about a potentially, having a second injury before that first injury is healed.

LORI TERRYBERRY-SPOHR, PhD, ABPP, Madonna Rehabilitation Hospital, Director of Rehabilitation
Although thankfully, the occurrence of full bleeds fowling multiple concussions is fairly rare, nevertheless, it has been fully documented and realized in many individuals under the age of twenty-five. Therefore, we have to be very careful about preventing that secondary injury.

KODY MOFFATT
When we look at concussion recovery in the Return to Play process, it really needs to be individualized. There's no one set cookbook approach for any of this. It's a different process for a volleyball play than it is a football player.

RUSTY McKUNE
The Return to Play process is a gradual increase in activity, because we want to make sure were minimizing the opportunity for repeat injury. It's imperative that the licensed health care professional understand why it is so important that we take this Return to Play process in a stepwise progression and really monitor and ensure that this is done in a supervised fashion.

LORI TERRYBERRY-SPOHR
Although there not a lot of fixed and hard guidelines about how to return someone safely to play particularly contact sports, there are some international consensus guidelines that help determine best practices in this area. You, as a health care provider, can incorporate aspects of your assessment into determining whether perhaps that progression should take place even more slowly. Perhaps staying at each step along the way for more than one day to fully assess whether symptoms are returning or whether any problems are occurring before they are in a very high risk situation such as contact play.

KODY MOFFATT
Research is expanding on this subject, and we're learning more year by year, month by month. The recommendations in this course are really based on best practices as we know them now. And will likely change in the near future as we learn more.

LORI TERRYBERRY-SPOHR
So being careful about our progression and making sure that they have fully recovered before we put them into that type of high risk situation is considered very important.

RUSTY McKUNE
Return to Play is really where the rubber meets the road in identifying when it's safe for these individuals to return to play and return to their activity levels that they were at prior to suffering the initial injury.

To minimize the risk of re-injury, it's recommended that the following criteria are met before a patient begins a Return to Play Progression:

- No academic adjustments or adjustments are in place or needed.
- The patient is asymptomatic at rest and exertion.
- The patient has a normal neurocognitive score when compared to the baseline (if available), presumed baseline, or normative standard. (Testing shows that an individual who is not neurocognitively normal may be symptomatic.)
- The patient has normal Balance / Postural Stability scores compared to baseline (if available), presumed baseline, or normative standard.

As this course has previously emphasized, there must be **no** same-day Return to Play for an athlete diagnosed with a concussion or an athlete suspected of having a concussion who has not been evaluated by health care professionals. No matter what, once an athlete has returned to baseline, he or she must undertake a multistep progression.

The **Return to Play Progression** follows this general pattern:

Clearance to START		**Monitoring**		**Management Team**
Return to Play Progression When patient tolerates limited activity.	→	Patient undertakes gradually increasing levels of activity and exertion, without return or worsening of symptoms.	→	**Approval** Patient demonstrates tolerance of full activity.

Return to Play Clearance
According to the Nebraska Concussion Awareness Act, a licensed health care professional must give written clearance to Return to Play. The law says:

> "Such student shall not be permitted to participate in any school supervised team athletic activities involving physical exertion, including, but not limited to, practices or games, until the student (i) has been evaluated by a licensed health care professional, (ii) has received written and signed clearance **to resume participation in athletic activities** from the licensed health care professional, and (iii) has submitted the written and signed clearance to resume participation in athletic activities to the school accompanied by written permission to resume participation from the student's parent or guardian." http://nebraskalegislature.gov/laws/statutes.php?statute=71-9101

Clearance to Return to Play Letter
This course recommends being very clear in your letter. Your initial role is to provide clearance for the *progression* to Return to Play. That is not the same as clearance to return to full activities and competition. You need to set the standards and steps for what the patient is allowed to do at what stage in the progression, based on symptoms and response to treatment, with continual monitoring and assessment.

A Clearance to Return to Play letter is not a carte-blanche license for the child to dive immediately full force into all activities. Be *clear* about what you're *clearing*.

Example of Nebraska Sports Concussion Network **Written Clearance / Permission Form**
http://www.nebsportsconcussion.org/images/pdfs/return%20to%20play%20-%20clearance%20form.pdf

Return to Play Progression
This course recommends that an athlete obtains a Clearance to Return to Play letter before undertaking Stage 2 in the Return to Play progression. That is a conservative approach, but conservatism is warranted given the risk of re-injury. If there are no problems along the way, the patient may progress from one step to the next and must complete all steps. The standard for high school is about one step per day.

Graduated Return to Play Progression Example

Rehabilitation Stage	Functional Exercise at each Stage of Rehabilitation	Objective of each Stage
1. No Activity	Symptom-limited physical and cognitive rest.	Recovery.
2. Light Aerobic Exercise	• Walking, swimming, or stationary cycling, keeping intensity < 70% maximum permitted heart rate. • No resistance training.	Increase HR.
3. Sport-Specific Exercise	Skating drills in ice hockey, running drills in soccer. No head impact activities.	Add movement.
4. Non-Contact Training Drills	• Progression to more complex training drills, e.g., passing drills in football and ice hockey. • May start progressive resistance training.	Exercise, coordination, and cognitive load.
5. Full-Contact Practice	Following medical clearance, participate in normal training activities.	Restore confidence, and assess functional skills by coaching staff.
6. **Return to Play**	Normal game play.	

4th International Conference on Concussion in Sport Zurich Statement http://bjsm.bmj.com/content/47/5/250.full

Detailed Return to Play Progression
ImPACT, UPMC Sports Medicine Concussion Program Guidelines for Post-Concussion Rehabilitation

Borg Rating of Perceived Exertion Scale
(in Resources in our course)
Use this scale as a way of measuring physical activity intensity level to help you evaluate a patient's readiness to Return to Play.

https://www.impacttest.com/uploads/resources/K_Sample__Post-Concussion_Rehab_Guidelines_%28UPMC%29.pdf Start the Return to Play Progression with a letter clearing the patient to proceed. Others on the care team may monitor. No matter who is involved, the patient *has* to progress. If symptoms reoccur or don't clear up, the injured child has to return to see a

licensed health care professional. It's a clinical preference how often the patient should return to the office for reassessment. Many providers only want to hear back if the symptoms persist or other problems occur.

When the patient has completed the monitored Return to Play Progression, the patient can be given approval for full contact play by a licensed health care professional. In cases where logistics make multiple trips unfeasible, some licensed health care professionals collaborate with the school professionals to provide the needed assessments and documentation.

An Example of a Return to Play Progression

Animation

A doctor must write a clearance letter for the patient to start a **Return to Play Progression**, which has been designed by the doctor along with the management team. The patient complies with each step of the **Return to Play Progression.** The school nurse assesses the patient using a checklist, and logs the patient's achievements. The nurse shares that information with the doctor. The doctor may choose to see the patient again to confirm full rehabilitation, or based on the nurse's assessment, the doctor approves the athlete's full **Return to Play**. The school or sports organization should be encouraged to archive these documents. The nurse should also keep the log on file.

Even with appropriate behavioral management, some students continue to experience significant symptoms after the two-week mark. Module 6 of this course will address complex concussion management in depth. At that point, your management team may expand beyond the initial group (you, the patient, the family, and the school staff) to include other licensed health care professionals who bring special expertise to the case.

